

APPENDIX A

UNOFFICIAL FCC PART 18 COMPLIANCE TESTING PROCEDURES USING A SPECTRUM ANALYZER

Due to the difficulty in obtaining some of the test equipment specified in FCC/OST MP-5 (1986), deviations from the MP-5 test procedures have been accepted by the FCC staff. One such procedure involves the use of a spectrum analyzer instead of a field intensity meter. Based on verbal instructions from the FCC Laboratory staff, Underwriter's Labs has used a spectrum analyzer to perform Part 18 compliance testing. Underwriters performs Part 18 compliance testing of microwave ovens for one of the two major U.S. manufacturers of microwave ovens. Similar procedures were conveyed to NTIA/ITS staff in preparation its microwave oven measurements. For more information concerning this procedure or other permissible deviations from MP-5, contact FCC Laboratory, 7435 Oakland Mills Road, Columbia, MD 21046.

The test procedures for use of a spectrum analyzer are as follows.

EQUIPMENT

- 1) Spectrum analyzer
- 2) The 6 db bandwidth shall not be less than 1 MHz for measurements above 1000 MHz. Therefore, a 3 dB bandwidth (as is commonly specified) greater than or equal to 1 MHz is acceptable.
- 3) Emission measurements above 1000 MHz need not be performed on an outdoor range, but may be made at a suitable indoor site.
- 4) A linearly polarized horn antenna shall be used.

TESTS TO BE PERFORMED

- 1) Oven output power measurements via calorimetric testing shall be measured.
- 2) Radiated emission measurements shall be measured.

TEST PROCEDURES

- 1) The power measurement is performed by placing 1 liter of water at a known temperature in the center of the cavity and heating it at "full power" for a known period of time (5 minutes is suggested). The temperature of the water is measured after the heating, and the total energy coupled into the load is computed by assuming

1° C temperature increase per milliliter of water per calorie. The energy is divided by the time of heating to get total energy rate, in Joules/second = Watts. The equation to be used is:

$$\text{Watts coupled into load} = (\Delta T(^{\circ}\text{C}) * 4187) / \Delta t(\text{seconds}).$$

- 2) Radiated emission level measurements are performed with a peak detector, 0 Hz span, 1 MHz IF bandwidth, and 3 Hz video bandwidth and linear amplification. Distance from the unit under test is 3 meters. Measurement height is 1 meter above the ground. Measured amplitudes are converted to field strength in dB μ V/m at 300 meters, as per MP-5 § 4.6.1.
- 3) Emission levels are measured at selected frequencies adjacent to the 2400-2500 MHz ISM band. These frequencies are based on peaks observed in initial wide bandwidth measurements.
- 4) The second through fifth harmonics are measured with the same measurement configuration as described above (MP-5 § 2.3 requires that field intensity meter measurements be performed up to the 10th harmonic or the highest detectable emission).